REMARKS

Applicant respectfully requests reconsideration of the above identified patent application. Claims 14-18, 20-21, and 23-26 remain in the application. Claim 14 is amended to more particularly point out and distinctly claim the subject matter that Applicant believes is the invention. Claims 23-26 are withdrawn subject to the allowance of a generic claim. Claims 1-13, 19, and 22 are canceled. Applicant traverses the rejection under 35 U.S.C. 103.

I. Invention Summary

The present invention is directed to a vehicle doorbeam having a relatively low profile and a relatively high strength. The doorbeam is fabricated from a web, and includes a beam portion and two bracket portions extending from opposite ends of the beam portion. As defined in amended independent claims 14 and 17, the beam portion includes first and second lateral portions rolled inwardly into closed configurations. As shown in Fig. 2, the first lateral edge abuts the web and is connected to the web along its longitudinal extent. The second lateral edge abuts the web and is also connected to the web along its longitudinal extent. As further defined in claim 14, the lateral portions each include a perpendicular portion that is perpendicular to the web and a transition portion that curves continuously to the perpendicular portion.

II. Section 103 Rejection

Claims 14-18 and 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,934,544 to Lee in view of U.S. Patent 6,591,577 to Goto and U.S. Patent 5,813,718 to Masuda.

Lee discloses an automotive bumper beam made by roll forming. The bumper includes a beam portion having first and second lateral portions. The first and second lateral portions are bent at right angles into flanges 60, 62. The lateral portions are rolled closed so that the flanges overlie the web and the lateral edges do not abut the web. The lateral portions may be connected to one another, but are not connected to the web.

Goto discloses a roll formed doorbeam with lateral portions that are rolled into first and second closed configurations 6,6. Like Lee, the first and second lateral portions are bent at right angles into flanges 7,7 so that the flanges overlie the web and the lateral edges do not abut the web. The flanges 7,7 overlap each other, and are connected to the web by a single weld line extending through both of the flanges and the web along the longitudinal length of the web.

Masuda discloses a doorbeam with first and second lateral portions that are stamped into closed configurations. The stamped beam has a substantially triangular cross section, with each of the lateral portions bent at two acute angles. Both lateral edges engage, but are not connected to, the web. The Masuda construction is problematic in that unattached lateral edges tend to "walk" away from each other when the beam receives a load, sacrificing some of the beam's strength. In fact, Masuda specifically teaches away from the concept of welding in

vehicle doorbeams. At column 2, line 12, Masuda states that "It is an object of the present invention to provide an inexpensive guard beam for an automotive structure *that has no welding portion*." [Emphasis supplied]. At column 6, lines 35-41, Masuda additionally professes the advantages of forming a doorbeam using a process *without* welding.

Applicant respectfully submits that none of Lee, Goto or Masuda, alone or in combination, teach or suggest the subject matter of independent claims 14 and 17. Both Goto and Lee teach that the lateral portions are bent into flanges that overlie the web. The flanges of Goto are overlapped and attached to the web. The flanges of Lee may be attached to one another, but are not attached to the web. The flanges of Goto and Lee add profile to the beam and add extra steps to the roll forming process. There is simply no motivation in the prior art, therefore, except the use of impermissible hindsight, for suggesting the doorbeam of the present invention wherein first and second lateral portions abut the web and are attached to the web.

Further, with respect to amended independent claim 14, Applicant submits that none of the references discloses the more specifically defined shape of the doorbeam. In particular, none of the references teaches a beam having lateral portions each including a perpendicular portion perpendicular to the web, a transition portion that curves continuously between the middle portion and the perpendicular portion. Masuda teaches a beam that is stamped in a number of bending operations into a triangular cross-section. Lee and Goto teach bending flanges into the lateral portions that engage the web. As shown and discussed below, the shape of the present invention provides a stronger beam, and allows the use of higher tensile strength materials.

In support of the patentability of the present invention, enclosed are 1) the Declaration of Sai Gadam and 2) the Declaration of Melvin J. Guiles. The Gadam Declaration provides information regarding the finite element analysis (FEA) of a variety of actual and hypothetical doorbeams, including that of the present invention and those of the prior art. The Guiles Declaration opines on the impracticality of manufacturing the prior art doorbeams using the preferred material of the present invention, which means that the FEA modeling shows the prior art doorbeams in the best possible (perhaps impossible) light.

First, the present beam, the Lee beam, the Goto beam, and the Masuda beam were modeled using the same material, the same material properties, and the same thickness (1.76 millimeters) for all three beams. The analysis simulated the performance of the beams in response to real-life loads, such as those encountered in an automobile accident. The analysis calculated the load required to deflect the center of each beam, for example, as would occur in a perpendicular side impact. The loads required to deflect the center of each beam 170 millimeters (mm) were 17 (kilo-Newtons) kN for the present beam, 13.2 kN for the Lee beam, 15.1 kN for the Goto beam, and 14.2 kN for the Masuda beam. Consequently, the present beam provides superior performance to both of the prior art beams when modeled at the same thickness.

Second, the present beam, the Lee beam, the Goto beam, and the Masuda beam were modeled using the same material, the same material properties, and the same weight. This modeling was performed in recognition of the importance of a beam's weight to its commercial desirability. For example, automobile manufacturers typically prefer lower weight components to higher weight components, so long as the lower weight component satisfies the relevant

specifications. At equal weights (3.252 kgs), the loads required to deflect the center of each beam 170 mm were 17 kN for the present beam, 13 kN for the Lee beam, 12.9 kN for the Goto beam, and 14.9 kN for the Masuda beam. Consequently, the present beam provides superior performance to both of the prior art beams when modeled at the same weight.

Third, the Lee beam was modeled to include weld lines between the flanges and the base of the doorbeam. The load required to deflect the center of the Lee beam 170 mm was 15.1 kN. Consequently, the present beam provides superior performance of a hypothetical Lee beam enhanced by the inclusion of weld lines.

In summary, the FEA established the superior performance of the present beam 1) when the beams have the same thickness, 2) when the beams have the same weight, and 3) even when the Lee beam is hypothetically enhanced to include weld lines.

Due to its shape, the present beam is capable of being manufactured from higher tensile strength materials than the Goto, Lee, and Masuda beams. As explained in the Declaration of Melvin J. Guiles, the Director of Technology and Advanced Engineering of the assignee, the higher tensile strength a material has, the more difficult it is to shape the material. In particular, it is more difficult to bend tight radii with high tensile strength materials than with materials of lower tensile strength. The beams disclosed by Goto and Lee both require bending flanges at the lateral edges of the beams that will abut the central portion of the beam. The Masuda beam requires bending the lateral portions of the beam at acute angles to achieve a triangular cross section. These tight radii require bending sharp corners in the material, which significantly limits the tensile strength of the materials that can be used for these beams. In fact,

Mr. Guiles states that it would not be possible to roll form the Goto, Lee, and Masuda beams from the high strength material (Martensite M220) that is preferably used in forming the Shape doorbeam without significantly reducing the material thickness, and therefore the strength, of the Goto, Lee, and Masuda beams relative to the Shape beam. Therefore, in modeling the Lee, Goto, and Masuda doorbeams using the same materials, material properties, and material thickness as for the present invention, the Lee, Goto, and Masuda beams were shown in the most favorable light – and according to Mr. Guiles an impossibly favorable light.

The Gadam and Guiles Declarations, presenting evidence of greater than expected results, are probative evidence of nonobviousness under 35 U.S.C. 103. MPEP 716.02(a) (Feb. 2003).

In view the foregoing remarks and the enclosed declarations, it is respectfully submitted that the cited references do not disclose, teach, or suggest the subject matter of the independent claims. It is therefore respectfully submitted that the rejection of these claims under 35 U.S.C. 103 is unfounded or overcome, and therefore should be withdrawn.

III. Dependent Claims

Dependent claims 15-16, 18, and 20-21 depend from amended claims 14 and 17 and are therefore even more clearly allowable. Claims 16 and 21 further recite that the first and second lateral portions are additionally connected to one another along a line separate from the first and second lateral edges. The Examiner asserts that Goto discloses this concept, however, Goto only discloses a single weld line that connects the flanges to the web. Goto does not disclose first and second lateral edges welded to the web, or first and second lateral portions

connected together along a line separate from the first line. Claim 15 further recites that the first and second lateral portions are of similar size and shape. Claim 18 further recites that the beam portion and the bracket portions are a single unitary piece. Claim 20 further recites that the beam portion includes a lateral center portion, and that the first and second lateral edges abut the piece at the lateral center portion.

IV. Conclusion

In view of the above amendments, the enclosed Declarations, and these remarks, Applicant respectfully submits that the present application is in condition for allowance. A notice to that effect is earnestly and respectfully requested.

Respectfully submitted,

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